

DBC series DBC 1105/1101/1301/2501

Horizontal NC Boring Machine



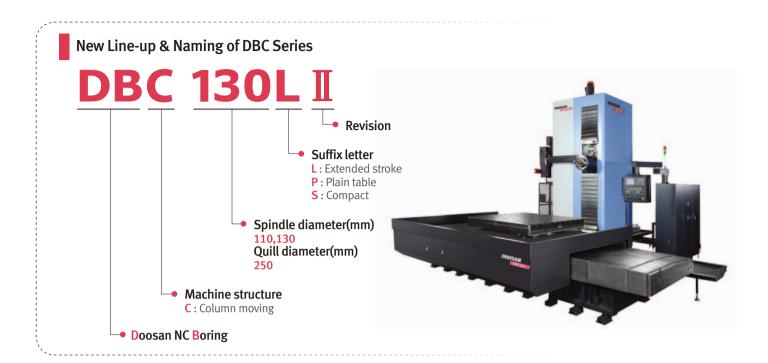
Column Moving Type NC Boring Machine Featuring the Latest Technologies

DBC series

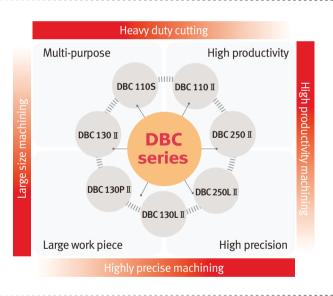
The DBC series, ranging from compact to super-size models, satisfies all our customers' requirements with DOOSAN's advanced technical prowess. A product line-up has been established for processing from middle to larget size parts including die/mold parts. We are improving productivity and creating values for our customers on the basis of our design improvements including enhanced operating convenience and efficiency.

DBC 1105/110 I/130 I/250 I





Product Line up



Speedy response to the market request

- 1. Full line-up available from compact types with minimized footprints to super-large models, for processing everything from large parts to die/mold applications
- 2. Diversified production line-up provides high-value-added machining

Customer orientated focus to improvement

- 1. Productivity improved by providing large capacity work space
- 2. Enhanced reliability and easy maintenance achieved by simplified design.

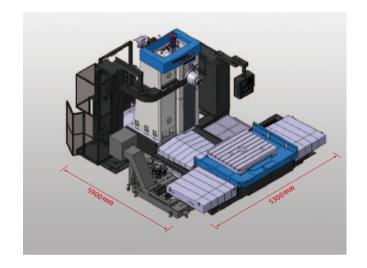
Diverse Line-up

The DBC series provides a full line-up of models covering compact, high-productivity, multi-functional, heavy loads and large work pieces.

DBC series

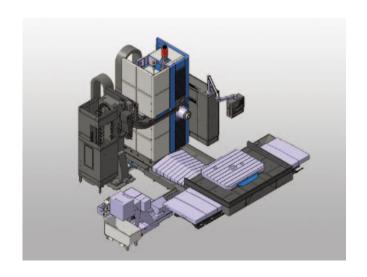
Compact Type Model DBC 110S

- Compact specifications of DBC 110 **I** offers customers a wide range of options
- Compact structure minimizes machine footprint
- Multi-functional model offers price competitiveness



High Productivity Model ■■■ DBC 110 ■

- High-productivity model features high-speed spindle
- Superior for deep cutting boring operation is possible up to the table center due to W-axis travel





Compact Type Model DBC 130 II / 250 II

- A steady-seller with more than 1000 sets sold to date. The standard model is regularly upgraded with our accumulated design know-how and production technologies.
- Shortest delivery time by modular production system.

Compact Type Model •••• **DBC 130P** II

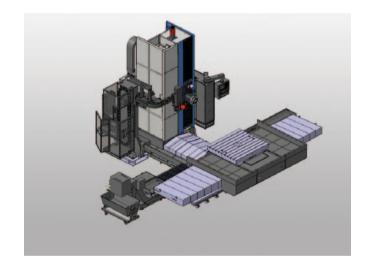
Plain type table

• Work pieces are stably and firmly set up for efficient cutting

Table length

20000 kg 3000 mm (44091.8 lb) (118.1 inch)

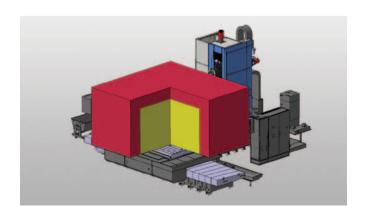
Load capacity



Large capacity Model •••• **DBC 130L** II / **DBC 250L** II

• Cutting not limited by size

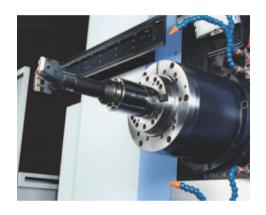
Travel (mm) X/Y/Z 4000 / 2500 / 2000 mm (157.5 / 98.4 / 78.7 inch)



Spindle

Nose-type head structure allows easy access to the work piece. Minimal protrusion of boring spindle enables stable cutting operation.

DBC series



Spindle Head

The spindle is supported with double-row cylinder roller bearings and double-row angular contact ball bearings which are lubricated with air oil or oil mist to bear heavy lateral loads. The rigidity of the spindle head of the DBC series has been greatly improved, increasing the cutting capacity with the W-axis protruding more than double that of previous models.

* DBC 130/L/P: air oil lubricated, two double-row cylinder roller bearings DBC 110 II: air oil lubricated, four double-row angular contact ball bearings DBC 110S: oil mist lubricated, four double-row angular contact ball bearings

Max. spindle speed

DBC 110S

DBC 110 π

DBC 130/L/P Ⅱ

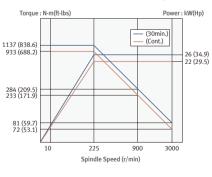
DBC 250/L Ⅱ

3000 r/min 4000 r/min 2500 r/min

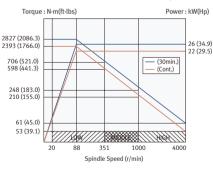
6000 r/min

Spindle power-torque diagram

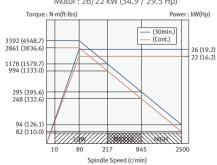
DBC 110S Motor: 26/22 kW (34.9 / 29.5 Hp)



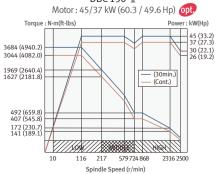
DBC 110 II Motor: 26/22 kW (34.9 / 29.5 Hp)



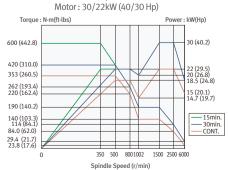




DBC 130 II



DBC 250 / 250 L II





DBC 110S
High-speed spindle with high-rigidity



Model		e speed nin)	Spindle (kW	Torque [N·m (ft.lb)]	
	Standard	Option	Standard	Option	[ואיווו (ונגוט)]
DBC 110S	3000	-	26/22 (35/30) (30min)	30/22 (40/30) (15min) (AMP UP)	1137 (1524.7) std 1273 (1707.1) opt

DBC 130/L/P Ⅱ

Heavy duty cutting spindle with high-rigidity



• High-power main spindle available

Spindle speed Spindle motor Torque (r/min) (kW (Hp)) Model [N·m (ft.lb)] Option Standard Option Standard 30/22 (40/30) 3392 (4548.7) std. DBC 26/22 (35/30) (15min) 3940 (5283.5) opt. 3684 (4940.2) opt. 2500 130/L/P I (30min) (AMP UP) 45/37 (30min)

DBC 110 II

High-speed spindle with high-rigidity



for higher productivity

• High-power main spindle available

Spindle speed Spindle motor Torque (kW (Hp)) (r/min) Model [N·m (ft.lb)] Standard Option Standard Option 30/22 (40/30) 3259 (2405.1) std. 26/22 (35/30) (15min) 4000 3259 (2405.1) opt DBC 110 II (30min) (AMP UP) 3850 (2841.3) opt. 45/37 (30min)

DBC 250/L II

High-speed, high-power built-in spindle



- High speed Built-in spindle for high precision machining
- Rigid structure for quill (Ø250mm) feeding
- Greased-type lubrication for the spindle bearings
- •Stable thermal growth of the spindle bearings even for long operating times

Model		oindle speed Spindle motor (r/min) (kW (Hp))			Torque [N·m (ft.lb)]
	Standard	Option	Standard	Option	[(מיווו (ונגוט)]
DBC 250/L II	6000	-	30/22 (40/30) (30min)	-	598 (441)

^{*} For further details, please contact Doosan.

Structure

For heavy work pieces and high processing quality, the design has been improved with a cast structure offering excellent stiffness. Structural analysis of the inner rib structure has further upgraded machine performance.

DBC series

High Rigidity Structure

For heavy work pieces and high processing quality, the design has been improved to deliver excellent dynamic performance cast structure. Structural analysis of the inner rib structure has further upgraded machine performance.

Column Structure

Low center of gravity design minimized vibration. Suitable for heavy loads due to column travel system



High Rigidity Design of Major Units

Rigidity is enhanced by optimal design of the machine structure.

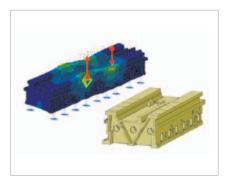
Great accuracy can be achieved by minimizing deformation caused by heavy load.



Design focused on low center of gravity of column to minimize vibration during column travel.



Deformation caused by heavy work pieces minimized by optimized design of table and table base



Deformation and vibration minimized by M-type design of the ribs inside the bed.



Stable Machine Structure



A highly rigid, stable machine structure has been realized by optimizing the design of the column and bed. Excellent wear resistance and accuracy for machining quality have been achieved by precision grinding after heat treatment.

A leveling block is provided to strengthen anchoring force to the foundation, as well as enabling fast and easy installation.

* Except DBC 110S (leveling bolt type)

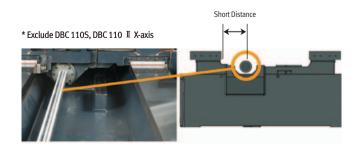






Designed with narrow guide system to minimise axis torque and ensure smooth motion

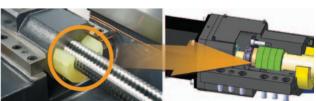
Designed with narrow guide system to minimise axis torque and ensure smooth motion



4-row Angular Ball Bearings & Ball Screw

Both ends of the shafts are supported with 4-row angular contact bearings. A low noise, high precision ball screw has been adopted for axis travel.

* Except DBC 110S (3-row angular contact bearings).





Rotary Table

* Related patent right reserved.

A high accuracy encoder is installed at the table center to provide precise rotational position (B-axis).

* Except DBC 130P II



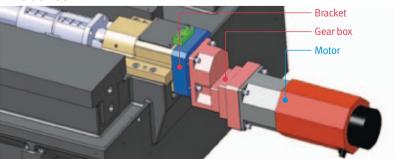
High Accuracy Locate Pin for 90 degree table positioning

Transfer Axis Speed Reducer (X/Z)

- Servo load has been reduced to secure stable feed characteristics for heavy work pieces (X-axis).
- Thrust in axis direction has been increased to improve cutting capacity (Z-axis).

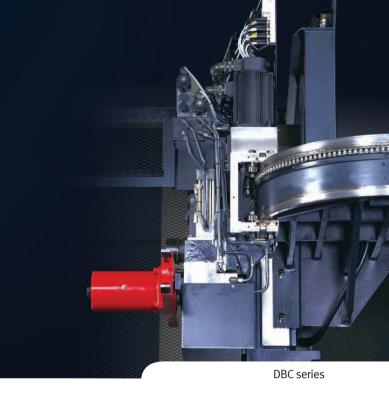
DBC 130L II / DBC 130P II (X AXIS) / DBC 250L II 600
DBC 110S / DBC 110 II / DBC 130 II / DBC 130P II (Z AXIS) / DBC 250 II 600

DBC series



ATC & Magazine

The adoption of a servo-motor for tool magazine and carriage drive greatly reduces hydraulic system load of the entire machine. Machine has been improved by simplifying the structure to minimize the causes of failure.



Servo-driven Auto Tool Changer 🐠

Servo tool magazine & servo carriage









Automatic tool changer

Servo tool magazine Servo carriage

Acceptable tool dimensions



Tool magazine

	Spec.	Shape
	Facing Tool D=ø250 mm	
Max. Tool Diameter	Boring Tool D=ø400 mm (15.8 inch)	0.250mm
Max. Tool Length	L = 600 mm (23.6 inch)	L
Max. Tool Weight	W = 25 kg (55.1lb) W = 30 kg (66.1lb) opt	W Max. A

Allowable moment: 34 N·m

[•] Please contact our engineer if you wish to extend the boring tool's diameter.

Easy Chip Disposal

Proper chip disposal is very important for productivity and environmental protection. The DBC series provides various chip disposal systems designed to improve productivity and the working environment.

Easy Chip Removal Structure

The completely enclosed DBC series guarantee the confinement of chips and coolant to the inside of the machining area. Chips fall into the removable forward mounted chip pan for easy disposal.





Coolant gun opt.



Coolant Splash Guard

Semi Guard DBC 110S







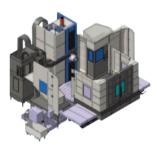
Coil conveyor opt

Hinged belt conveyor DBC 110S, DBC 110 ${\rm I\hspace{-.1em}I}$,DBC130/L ${\rm I\hspace{-.1em}I}$ DBC 130P II, DBC 250/L II

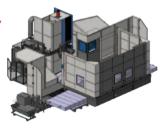
Chip pan

Slope-type pan for smooth coolant drain and chip disposal.

Semi Guard DBC 110 II



Semi Guard DBC 130/L/PI, DBC 250/L II



Semi Guard with auto door DBC 130(L) Ⅱ,

DBC 250(L) II



Optional Equipment

Special specifications applicable by new development















F	Α	В	С
	450 (17.7)	600 (23.6)	400 (15.8)
В	500 (20)	1000 (39.4)	550 (21.7)
	750 (29.5)	1250 (49.2)	750 (29.5)
	1000 (39.4)	2000 (78.7)	1000 (39.4)
CA			Unit : mm (inch)

- 1. Angle head (Manual) (L=365)
- 2. Long type angle head (Manual) (L=660)
- 3. Universal head (Manual)
- 4. Face plate (Manual)
- 5. Indexable angle head (90° index)
- 6. Spindle support *
 - *: To use ATC with attached spindle support, please contact Doosan
- 7. Facing head (Cogsdill) *
- Manual / Automatic attach available
- *: For more details, please contact Doosan.
- 8. Angle plate (4 types)
 - · Please contact us for special specifications.
 - · Please contact us for further information.

Easy Operation Package

Process Monitoring Function

Doosan tool load monitoring std.

- Automatic detection of tool wear and damage under abnormal loads
- Individual work-piece data can be saved



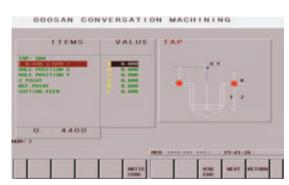
Work Load Counter Control std.



When the operator enters the M-code for the weight of the work piece, the system automatically determines the table feed pattern to perform cutting.

M-Code	Work Load	DBC 110S	DBC 110 II	DBC 130 II	DBC 130L II	DBC 130P II	DBC 250 II	DBC 250L II
M380	5 Ton and less	•	•	•	•	•	•	•
M381	10 Ton and less		•	•	•	•	•	•
M382	15 Ton and less			•	•	•	•	•
M383	20 Ton and less				• @	•		

Easy Pattern Cycle std.



Major processing pattern cycles and programs can be created by entering major factors only. This function is built-in in the CNC, thus reducing programming time greatly and enabling easy application on site. A total of 22 patterns including basic 5 patterns are provided.

Periodic Checking Function std.

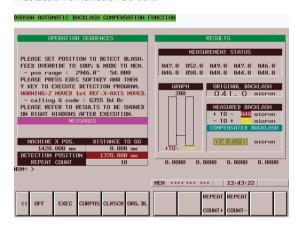
This function informs the operator of equipment status with various instructions, e. g. oil refill, ready for machine service.



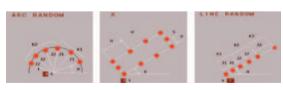
Automatic Backlash Compensation std.



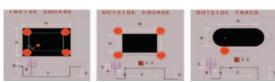
After setting up the work piece, feed backlash is automatically detected and compensated by the G-code instruction or function screen.



Drilling pattern



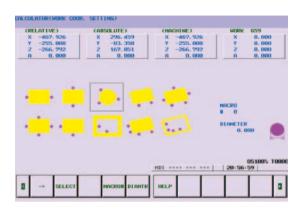
End-mill pattern



Optional Fuction

Easy Set-up Guidance Touch Sensor (OMP60) on

This function enables the simple setting up of work-piece coordinates, using an automatic or semi-automatic measurement probe. When using an auto-measuring probe, place the probe close to the set up surface, elect the setup configuration, and press the cycle start button. The system touches the point and sets the work-piece coordinates automatically.



Tool Control Function of



• Tools are protected from abnormal load on the servo shaft, by skipping the tool or generating a freehold alarm.

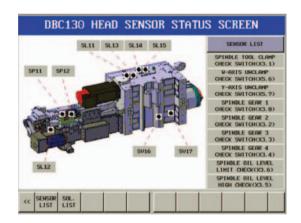


Support Function for Maintenance

Easy Operation Guidance on



Machine faults including problems with the ATC magazine are detected and troubleshooting suggestions are proposed for corrective action. For guidance on easy operation, display windows - including function selection, thermal error setting, program progress display, and operation report display - are provided.



Operating Performance Improvement

Productivity improved by adoption of operator panel design optimized for the operation of large machines

- Mono lever jog switches are provided at the bottom of the main operator panel for easy traverse of the long axis of large machines (standard).
- Pulse handle for the operator's convenience and portable MPG for easy work piece setting are provided as standard features.



Mono lever jog switches



Portable MPG



3 Portable MPG



MPG with LCD opt. display



ATC OP panel opt

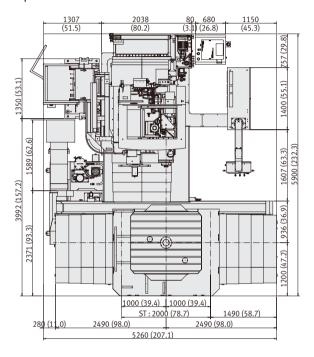


External Dimensions & Table Dimensions

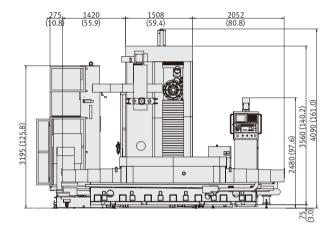
Unit: mm (inch)

DBC 110S

Top View



Front View



Side View

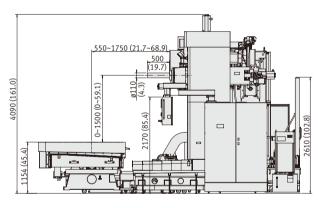
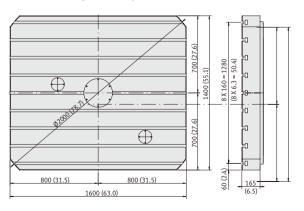
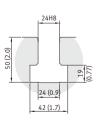


Table std.

1400 x 1600 (55.1 x 63)



T-Slot



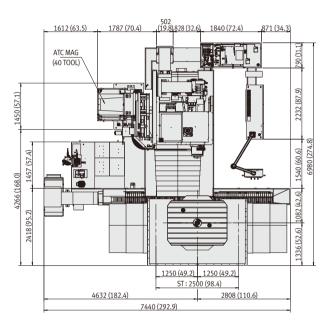
[•] The specifications and information above-mentioned may be changed without prior notice.
• For more details, please contact Doosan

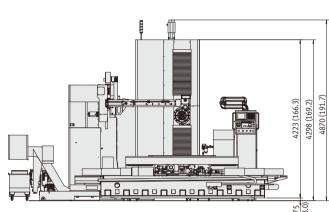
External Dimensions & Table Dimensions

Unit: mm (inch)

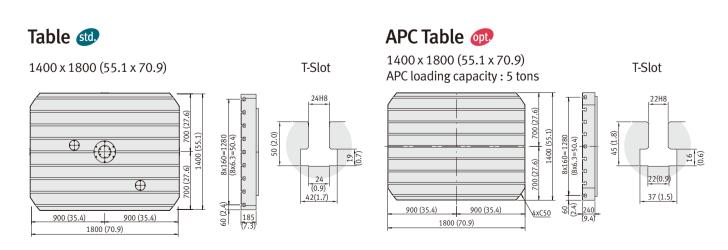
DBC 110 II

Top View





Side View

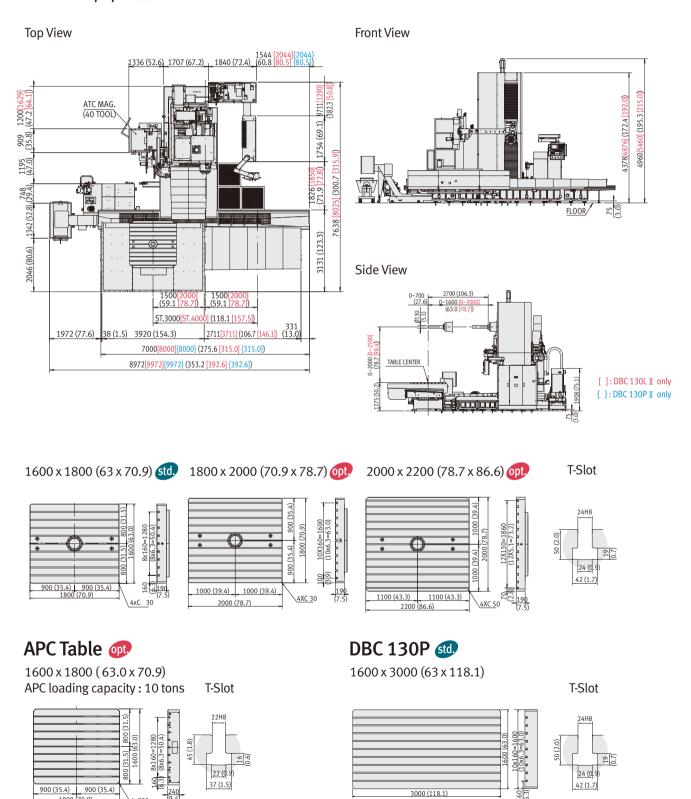


Front View

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DBC 130/L/P II

1800 (70.9)



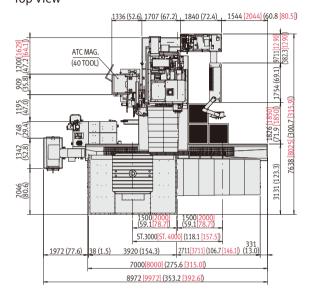
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External Dimensions & Table Dimensions

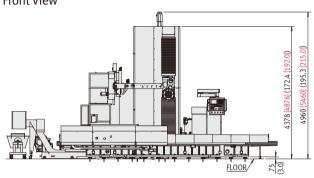
Unit: mm (inch)

DBC 250/L II

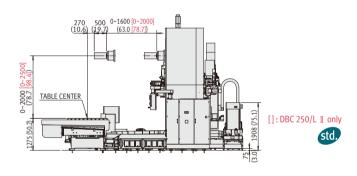
Top View



Front View

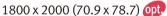


Side View



1600 x 1800 (63 x 70.9) std.

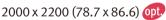




1000 (39.4)

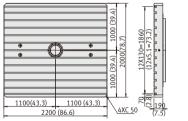


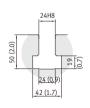
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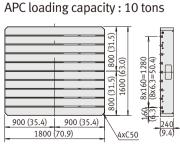


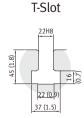
APC Table

900 (35.4) 90 1800 (70.9)

1600 x 1800 (63.0 x 70.9)

900 (35.4)





1000 (39.4)

[•] The specifications and information above-mentioned may be changed without prior notice. • For more details, please contact Doosan

Machine Specifications

	Description	า	Unit	DBC 110S	DBC 110 II	DBC 130 II	DBC 130L II	DBC 130P II	DBC 250 II	DBC 250L II
		X-axis	mm (inch)	2000 (78.7)	2500 (98.4)	3000 (118.1)	4000 (157.5)	3000 ((118.1)	4000 (157.5)
	Travel	Y-axis	mm (inch)	1500 (59)	2000	(78.7)	2500 (98.4)	2000	(78.7)	2500 (98.4)
	distance	Z-axis	mm (inch)	1200 (47.2)	1500 (59)	1600 (63)	2000 (78.7)	1600) (63)	2000 (78.7)
Travels		W-axis	mm (inch)	500 (19.6)	550 (21.7)		700 (27.6)		500 (19.7)
	Distance from spindle nose to table top		mm (inch)	0~1500 (0~59)	0~2000	(0~78.7)	0~2500 (0~98.4)	100~2100 (3.9~82.7)	0~2000 (0~78.7)	0~2500 (0~98.4)
	Distance fi to table ce	rom spindle nose nter	mm (inch)	550~1750 (21.7~68.9)	550~2050 (22.7~80.7)	700~2300 (27.6~90.5)	700~2700 (27.6~106.3)	700~2300 (27.6~90.5)	770~2370 (30.3~93.3)	770~2770 (30.3~109.1)
Feedrates	Rapid Traverse Rate	X, Y, Z-axis	m/min (ipm)		12 10 (472.4) (393.7)		10 / 8 / 10 {7 / 8 / 10} (393.7 / 315 / 393.7 {275.6 / 315 / 393.7})	7 / 8 / 10 (276.5 / 315 / 393.7)	10 (393.7)	10 / 8 / 10 (393.7 / 315 / 393.7)
		W-axis	m/min (ipm)			6 (236.2)			10 (3	93.7)
	Cutting feedrate	X, Y, Z-axis	mm/min (ipm)	1 ~ 6000	(1~236.2)		1	l~4000 (1~157.5	5)	
	Table size		mm (inch)	1400 x 1600 (55.1 x 63)	1400 x 1800 (55.1 x 70.9)	{1800 x 2000 (55.1	x 1800 , 2000 x 2200} x 70.9 , 78.7 x 86.6})	1600 x 3000 (63 x 118.1)	1600 x 1800 {1800 x 2000, 2000 x 2200} (55.1 x 70.9 {70.9 x 78.7, 78.7 x 86.6})	
	Swing	Without semi-S/G	mm (inch)	ø2550	Ø3400 (Ø133.8)	Ø3900 (Ø153.5)	Ø4800 (Ø188.9)	-	Ø3900 (Ø153.5)	Ø4800 (Ø188.9)
	Diameter	Semi-S/G	mm (inch)	Ø2100 (Ø82.6)	Ø2250 (Ø88.5)	Ø3400	(Ø133.8)	-	Ø3400 (Ø133.8)
		1400 × 1600 mm	kg (lb)	7000 (15432.1)	-	-	-	-	-	-
Table	Table loading capacity	1400 × 1800 mm	kg (lb)	-	10000 (22045.9)	-	-	-	-	-
ruste		1600 × 3000 mm	kg (lb)	-	-	-	-	20000 (44091.8)	-	-
		1600 × 1800 mm	kg (lb)	-	-	15000 ((33068.9)	-	15000 (3	33068.9)
		1800 × 2000 mm	kg (lb)	-	-	13000 (28659.7)	13000 {20000} (28659.7 {44091.8})	-	13000 (2	28659.7)
		2000 × 2200 mm	kg (lb)	-	-	12000 (26455.1)	12000 {19000} (26455.1 {41887.2})	-	12000 (2	26455.1)
	Max. spind	dle speed	r/min	3000	4000	2500 6000			00	
Spindle	Boring spi	ndle diameter	mm (inch)	110	(4.3)		130 (5.1)			
	Quill diam	eter	mm (inch)			-			250	(9.8)
	Tool Strora	age capacity	ea				40 / 60 / 90			
	Tool shank	<					MAS403 BT50			
ATC	Max. tool o	diameter	mm (inch)			Ø130) {Ø600} (Ø5.1 {Ø	23.6})		
ATC	Max. tool l	ength	mm (inch)				600 (23.6)			
	Max. tool v	weight	kg (lb)	25 {30} (55.1 {66.1})						
	Method of	tool selection					Fixed address			
Motors	'	otor (30min/cont.) 15min/cont.}	kW	26 / 22 {30 / 22} (34.9/29.5 {40.2 / 29.5})	26 / 22 {30 / 22}, {45 / 37} (34.9 / 29.5 {40.2 / 2 9.5} {60.3 / 49.6})		22 {30 / 22}, {45 5 {40.2 /2 9.5} {6		30 / 22 (4	0.2 / 49.6)
Power source	Electric po (rated cap	wer supply acity)	kVA		70 {85}					
	Height		mm (inch)	4090 (159.4)	4870 (192.9)	4960 (195.3)	5460 (215.0)	4960 ((195.3)	5460 (215.0)
Machine	Length × V	Vidth	mm (inch)	5260 × 5900 (207.1 x 232.2)	7440 × 6980 (275.6) x (271.7)	8970 × 7640 (353.1 × 300.4)	9970 × 8030 (392.5 × 315.4)	9970 ×7650 (392.5 × 301.2)	8970 × 7640 (353.1 × 300.4)	9970 ×8030 (392.5 × 315.4)
Dimensions	Weight		kg (lb)	24000 (52910.2)	36000 (79365.2)	43000 (94797.4)	48000 {50000} (105821.9 {110231.1})	47000 (103616.0)	43000 (94797.4)	48000 (105821.9)
- The 10	cations and information above me				<u> </u>	<u> </u>	(/)/	l	l	∫]. Ontion

[•] The specifications and information above-mentioned may be changed without prior notice.
• For more details, please contact Doosan

Standard Feature & Optional Feature

Standard Feature

- Spindle Air Curtain (Only DBC 250/L Ⅱ)
- Spindle Cooling System
- Spindle Lubrication Device
- Spindle Internal Cooling System

[Only DBC 110S, DBC 110 \mathbb{I} , DBC 130/L/P \mathbb{I}]

- Axis Gear Box for Y-axis
- B-axis Rotary Encoder
- Automatic Table Clamping Unit
- Automatic Table Locating Pin (each 90°)
- W-axis Clamp [Only DBC 110, DBC 250/L II]
- Tool KIT
- Leveling Blocks & Anchoring Bolts [Except DBC 110S]
- Leveling Blocks & Anchoring Bolts [Only DBC 110S]
- Z-axis Coolant Pan
- Table Chip Pan
- Column Guideway Chip cover
- Slide Way Covers (X/Y/Z)
- Chip Disposal

Chip conveyor & Chip tray

- Main OP. Panel
- 2-Linkage type
- Portable-MPG
- Work Light (LED Lamp)
- Signal Tower
- Foot Switch for Tool Unclamp
- Mono Lever Jog Switches
- Spindle Load Meter
- Spindle Thermal Compensation System [Except DBC 250/L II]
- Periodical Checking Function
- Actual Spindle Speed Display on LCD
- Self Diagnosis Function
- DSQ1*
- Customer's Manual
- Work Load Counter Control®
- Easy pattern Cycle
- Linear Scale Feedback System

Absolute Type

[Only DBC 250/L II, DBC 110-X AXIS]

- Big Plus[®] Spindle [ExceptDBC 130/L Ⅱ]
- ATC (ATC OP.Panel) 40 tool
- Doosan Tool Load Monitoring
- Automatic Backlash Compensation

[Only X-axis, without Linear scale]

* Note) DSQ1 : AICC $\, \mathbb{I} \,$ with High Speed Processing + Machining Condition Selection + Data Server(1GB)

Optional feature

- Adaptive Feedrate Control Function
- Attachment

Manual Head (L=365)

Manual Long Type (L=660)

Indexable Angle Head (90° Index)

Manual Universal Head (L=500)

Manual Face Plate (ø650)

Spindle Support (DBC 130/L/P II : L = 310)

(DBC 110 II, DBC 110S: L= 200)

Attachment Ready (Cogsdill)

Attachment Ready (D'Andrea)

- Spindle Thermal Compensation System
- [Except DBC 250/L II]

Coolant systems

Air Blower MQL System

Coolant Gun

TSC-20bar

High Capacity Type Coolant Pump

Oil Skimmer

- Safety Fence & Interlock Switches
- Coolant Splash Guard

Semi Guard

Auto Door Semi Guard

• Linear Scale Feedback System

Absolute Type

[Only DBC 110S, DBC 110, DBC 130/L/P $\, \mathbb{I} \,$]

- ATC (ATC OP. Panel) 40/60/90 tools
- APC (APC OP. Panel)

Max. Workpiece Weight DBC 110 II:5 ton

DBC130/L II,250/L II:10ton

- Air Gun
- Auto Tool Length Measurement
- Tool Breakage Detect Function
- Master Tool for Auto-Tool Length Measurement
- Auto Workpiece Measurement
- Easy Set Up Guidance® (with OMP60)
- Master Block gauge for

Auto Workpiece Measurement

- Test Bar (BT 50)
- MPG with LCD display
- Chip Disposal

Lift Up Chip Conveyor Hinged Belt Type Magnetic Scraper Type

380L

Chip Bucket

- Raising Block (250mm)
- Additional 6th Axis

Package #1: Only Wiring

• Angle Plate

450 X 600 X 400mm / 500 X 1000 X 550mm 750 X 1250 X 750mm / 1000 X 2000 X 1000mm

- Edge Locator (Table/ Pallet)
- Big Plus® Spindle (Only DBC 130(L))
- CNC Systems (Heidenhain)
- Auto Power On/Off
- Electric Line Filter
- Work Counter
- Total Counter
- Electric Leakage Breaker
- Operator's Call Buzzer
- Electric Box Light
- Electric Box Air con
- 3-MPG (Portable)
- Tool Control Function
- Easy Operation Guidance
- DSQ2 *
- DSQ3 *
- Speed Limit Control for Attachment
- Machine Warming Up Function
- Center Bush (Ø50mm) (Except DBC 110S)
- Add Y Brake
- External M-CODE (4ea)
- * Note) DSQ2 : DSQ1 + Data Server (1GB) DSQ3: AICC II with high speed processing + Machine condition selection + Data server

[•] The specifications and information above-mentioned may be changed without prior notice. • For more details, please contact Doosan

NC Unit Specifications

Fanuc 31i

DBC 110 I, DBC 130/L/P I, DBC 250/L I

AXES CONTROL

70125 CONTINUE			
- Controlled axes	5 (X, Y, Z, W, B)		
- Simultaneously control	lable axes		
Positioning(G00)/Linear	interpolation(G01):3 axes		
Circular interpola	tion(G02, G03): 2 axes		
- Backlash compensati	on		
- Emergency stop / overtravel			
- Follow up			
- Least command increment	0.001mm / 0.0001(inch)		
- Least input increment	0.001mm / 0.0001(inch)		
- Machine lock	all axes / Z axis		
- Mirror image	Reverse axis movement		

- (setting screen and M function) - Stored pitch error compensation
- Pitch error offset compensation for each axis
- Stored stroke check 1

Overtravel controlled by software

INTERPOLATION & FEED FUNCTION				
- 2nd reference point retu	ırn G30			
- Circular interpolation	G02, G03			
- Dwell	G04			
- Exact stop check	G09, G61(mode)			
- Feed per minute	mm / min			
- Feedrate override (10% ir	ncrements) 0 - 200 %			
- Jog feedrate	0~ 5000 mm/min			
- Linear interpolation	G01			
- Manual handle feed(1 u	nit)			
- Manual handle feedrate	0.1/0.01/0.001mm			
- Override cancel	M48 / M49			
- Positioning	G00			
- Rapid traverse override				
F0 (fine fe	ed), 25 / 50 / 100 %			
- Reference point return	G27, G28, G29			
- Skip function	G31			
- Helical interpolation				
- Al Contour Control I	200 block preview			
- Thread cutting, synchron	nous cutting			
- Program restart				
- Automatic corner decele	eration			
- Feedrate clamp by circu	lar radius			
- Linear ACC/DEC before i	nterpolation			
- Linear ACC/DEC after int	terpolation			
 Control axis detach 				
- Rapid traverse bell-shap	oed acceleration/			
deceleration				
- Dual position feedback				

SPINDLE & M-CODE FUNCTION

- Smooth backlash compensation

- M- code function	M 3 digits
- Spindle orientation	
- Spindle serial output	
- Spindle speed command	S5 digits
- Spindle speed override (10%	6 increments)
	10 - 150 %
- Spindle output switching	
- Retraction for rigid tapping	
- Rigid tapping	G84, G74
- Polar coordinate interpolation	G12.1 / G13.1
- Scaling	G50, G51

TOOL FUNCTION

- Cutter compensation C

 Number of tool offsets 	200 ea
- Tool length compensation	G43, G44, G49
- Tool number command	T3 digits
- Tool life management	
Geometry / Wear and Length / Ra	ndius offset memory
- Tool offset memory C	

G40, G41, G42

PROGRAMMING & EDITING FUNCTION

- Absolute / Incremental programming - Auto. Coordinate system setting

- Background editing
- Canned cycle G73, G74, G76, G80 G89, G99 - Circular interpolation by radius programming
- Custom macro B
- Custom size 512kb
- Addition of custom macro common variables
- Decimal point input

- I / O interface	RS - 232C
- Inch / metric conversion	G20 / G21
- Lahol skin	

- Local / Machine coordinate system G52 / G53
- Maximum commandable value

±99999.999mm (±9999.9999 inch)

 No. of Registered programs 	500 ea
- Optional block skip	
- Optional stop	M01
- Part program storage	640 m
- Program number	O4-digits
- Program protect	

- Program stop / end - Programmable data input

Tool offset and work offset are entered by G10, G11

M00 / M02, M30

- Sub program Up to 4 nesting - Tape code ISO / EIA Automatic discrimination

- Work coordinate system G54 - G59

- Additional work coordinate system(48 Pair)

G54.1 P1 - 48 pairs G68, G69

- Coordinate system rotation

- Extended part program editing

- Optional angle chamfering / corner R

- Macro executor

- Loadmeter display

OTHERS FUNCTIONS

(Operation, Setting & Display, etc)	
- Alarm display	
- Alarm history display	
- Clock function	
- Cycle start / Feed hold	
- Display of PMC alarm message	
Message display when PMC alarm occurred	d
- Dry run	
- Ethernet function (Embedded)	
- Graphic display Tool path drawing	g
- Help function	

- MDI / DISPLAY unit
10.4" color LCD, Keyboard for data input,
soft-keys
- Memory card interface

- Operation functions

Tape / Memory / MDI / Manual

- Operation history display
- Program restart
- Run hour and part number display
- Search function Sequence NO. / Program NO.
- Self diagnostic function
- Servo setting screen
- Single block
- External data input
- Multi language display

OPTIONAL SPECIFICATIONS

- 3-dimensional coordinate conversion
- 3-dimensional tool compensation
- 3rd / 4th reference return
- Addition of tool pairs for tool life management 1024 pairs
- Additional controlled axes

max. 6 axes in total

- Additional work coordinate system G54.1 P1 - 300 (300 pairs)

- Al Contour Control I 600 block preview - Automatic corner override G62 - Chopping function G81.1 - Cylindrical interpolation G07.1

- Data server
- Dynamic graphic display

Machining profile drawing

- Exponential interpolation
- Interpolation type pitch error compensation
- EZ Guide i (Doosan infracore Conversational Programming Solution)

with 10.4" Color TFT

- Tape format for FS15 - Increment system 1/10 - Figure copying G72.1, G72.2
- Manual handle feed 2/3 unit
- Handle interruption
- High speed skip function
- Involute interpolation
- G02.2, G03.2 - Machining time stamp function
- No. of Registered programs

1000 / 2000 / 4000 ea

- Number of tool offsets 400 / 499 / 999 / 2000 ea

- Optional block skip addition 9 blocks - Part program storage

512kb(1280m)/1mb(2560m)/2mb(5120m) /4mb(10240m)/8mb(20480m)

- Playback function

- Polar coordinate command G15 / G16 Programmable mirror image G50.1 / G51.1 Single direction positioning G60

- Stored stroke check 2 / 3

- Tool offset G45 - G48

- Position switch

NC Unit Specifications

Fanuc 32i

DBC 110S

AXES CONTROL	
- Controlled axes	5 (X, Y, Z, W, B)
- Simultaneous controlled axes	Positioning(G00)/Linearinterpolation (G01):3 axes
	Circular interpolation (G02, G03): 2 axes
- Backlash compensation	
- Emergency stop / overtravel	
- Follow up	
- Least command increment	0.001mm / 0.0001(inch)
- Least input increment	0.001mm / 0.0001(inch)
- Machine lock	all axes / Z axis
- Stored pitch error compensation	on .
Pitch e	error offset compensation for each axis
- Stored stroke check 1	Overtravel controlled by software
	,
INTERPOLATION & FEED FUN	CTION
- 2nd reference point return	
	G30
- Circular interpolation	G02, G03
- Dwell	G04
- Feed per minute	mm / min(ipm)
- Feedrate override (10% increm	
- Jog feedrate	0 - 5000 mm / min
- Linear interpolation	G01
- Manual handle feedrate	0.1/0.01/0.001mm
- Override cancel	M48 / M49
- Positioning	G00
- Rapid traverse override	F0 (fine feed), 25 / 50 / 100 %
- Reference point return	G27, G28, G29
- Skip function	G31
- Helical interpolation	
- NANO AICC (AI Contour Control) 200 block preview
- Thread cutting, synchronous cu	
- Program restart	<u> </u>
- Automatic corner deceleration	
- Feedrate clamp by circular radi	US
- Linear ACC/DEC before interpo	
CDINIDLE & M. CODE FUNCTIO	NA.
SPINDLE & M-CODE FUNCTION	
- M- code function	M 3 digits
- Spindle orientation	
- Spindle serial output	CF 1' '
- Spindle speed command	S5 digits
- Spindle speed override (10% in	
- Rigid tapping	G84, G74
- Polar coordinate interpolation	G12.1 / G13.1
- Scaling	G50, G51
TOOL FUNCTION	
- Auto. Coordinate system settin	g
- Background editing	-
- Canned cycle	G73, G74, G76, G80 - G89, G99
- Circular interpolation by radius	
- Custom macro B	p014111111115
- Custom filacio b	E1.21/1
	512kb
- I / O interface	RS - 2320
- Inch / metric conversion	G20 / G21
- Local / Machine coordinate sys	
- Maximum commandable value	
- No. of Registered programs	500 ea
- Ontional block skin	

- Part program storage	640m
- Program number	O4-digits
- Program protect	
- Program stop / end	M00 / M02, M30
- Programmable data input	Tool offset and work
	offset are entered by G10, G11
- Sub program	Up to 4 nesting
- Tape code	ISO / EIA Automatic discrimination
- Work coordinate system	G54 - G59
- Additional work coordinate system	(48 Pair) G54.1 P1 - 48 pairs
- Coordinate system rotation	G68, G69
- Macro executor	

OTHERS FUNCTIONS (Operation, Setting & Display, etc)

OTHERS FUNCTIONS (C	Speration, Setting & Display, etc)
- Alarm display	
- Cycle start / Feed hold	
- Display of PMC alarm m	essage Message display when PMC alarm occurred
- Dry run	
- Ethernet function (Embe	eded)
- Graphic display	Tool path drawing
- Help function	
- Loadmeter display	
- MDI / DISPLAY unit 10	0.4" color LCD, Keyboard for data input, soft-keys
- Memory card interface	
- Operation functions	Tape / Memory / MDI / Manual
- Program restart	
- Search function	Sequence NO. / Program NO.
- Servo setting screen	
- External data input	
- Multi language display	

OPTIONAL SPECIFICATIONS

M01

0	
- 3rd / 4th reference return	
- Addition of tool pairs for tool life management	512 pairs
- Additional controlled axes	max. 6 axes in total
- Additional work coordinate system G54.1	P1 - 300 (300 pairs)
- AI HPCC* (High Precision Contour Control) with 6	
	600 block preview
- Automatic corner override	G62
- Chopping function	G81.1
- Cylindrical interpolation	G07.1
- Interpolation type pitch error compensation	
- EZ Guide i (Doosan infracore Conversational Prog	gramming Solution)
	with 10.4" Color TFT
- Increment system 1/10	
- Manual handle feed 2/3 unit	
- Handle interruption	
- High speed skip function	
- Involute interpolation	G02.2, G03.2
- Machining time stamp function	
- No. of Registered programs	1000 ea
- Number of tool offsets	400 ea
- Optional block skip addition	9 blocks
- Part program storage	1280 / 2560 m
- Polar coordinate command	G15 / G16
- Programmable mirror image	G50.1 / G51.1
- Stored stroke check 2 / 3	
- Tool load monitoring function	
- Tool position offset	G45 - G48
- Position switch	

- Optional block skip - Optional stop

NC Unit Specifications

Heidenhain iTNC 530

DBC series

AXES CONTROL

- Controlled axes	5 (X, Y, Z, W, B)
- Simultaneous controlled axes	
	Positioning /Linear interpolation 5 axes
	Circular interpolation 2 axes
	Helical interpolation 3 axes
- Backlash compensation	
- Least command increment	0.001mm / 0.0001(inch)
- Least input increment	0.001mm / 0.0001(inch)
- Linear axis error compensation	1
- Reversal peaks with circular movement compensation	
- Stick-slip friction compensation	on

INTERPOLATION & FEED FUNCTION

- Straght line In	5 axes
- Circle	In 3 axes
- Helix interpolation	
- Spline interpolation	
- Feed hold	std.
- Feedrate override	0 -150 %
- Manual handwheel feed	1 unit
- Optional block skip	
- Single block	
- Feedfoward	

SPINDLE FUNCTION

- Spindle orientation	
- Spindle speed override	0 - 150%
- Spindle position control	

TOOL FUNCTION

- 3 dimensional tool compensation	
- Number of tool offset	999 ea
- Tool management	

PROGRAMMING & EDITING FUNCTION

- Heidenhain conversation format programmi	
- Program memory	Approx 26GB on hard disk
- No. of registered program	No limit
- Mathematical function	
- Programming with variable	Q parameters
- Caculator	
- Complete list of all current error message:	S
- Context-sensitive help function for error n	nessage
- The integrated help system TNC guide	
- Graphical support for programming cycles	S
- Comment and structure blocks in the NC	program
- Acture position capture	
- Graphic simulation	
- Plane view	
- Programming graphics	
- Returning to the contour	
- Datum tables	

OTHERS FUNCTIONS (Operation, Setting & Display, etc)

- Actual speed display	
- Alarm display	
- Display	TFT 15" color
- Clock function	
- Integrated oscilloscope	
- Log(error message and keystroke) use PCs	
- Diagnostic function	
- Trace function	
- Ethernet TCP / IP	
- USB USB1.1	

OPTIONAL SPECIFICATIONS

- Heidenhain DNC	
- DCM Collision	
- DXF Converter	
- Adaptive feed contour	
- KinematicsOpt	
- Workpiece touch probes	TS-series
- Tool touch probes	TT-series, TL Series





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